

## § 1065.267

all other hydrocarbons. You may humidify a sample and you may dilute a sample with purified air or oxygen (O<sub>2</sub>) upstream of the nonmethane cutter to optimize its performance. You must account for any sample humidification and dilution in emission calculations.

[70 FR 40516, July 13, 2005, as amended at 73 FR 37300, June 30, 2008]

### § 1065.267 Gas chromatograph.

(a) *Application.* You may use a gas chromatograph to measure CH<sub>4</sub> concentrations of diluted exhaust for batch sampling. While you may also use a nonmethane cutter to measure CH<sub>4</sub>, as described in §1065.265, use a reference procedure based on a gas chromatograph for comparison with any proposed alternate measurement procedure under §1065.10.

(b) *Component requirements.* We recommend that you use a gas chromatograph that meets the specifications in Table 1 of §1065.205, and it must also meet the linearity verification in §1065.307.

## NO<sub>x</sub> AND N<sub>2</sub>O MEASUREMENTS

### § 1065.270 Chemiluminescent detector.

(a) *Application.* You may use a chemiluminescent detector (CLD) to measure NO<sub>x</sub> concentration in raw or diluted exhaust for batch or continuous sampling. We generally accept a CLD for NO<sub>x</sub> measurement, even though it measures only NO and NO<sub>2</sub>, when coupled with an NO<sub>2</sub>-to-NO converter, since conventional engines and aftertreatment systems do not emit significant amounts of NO<sub>x</sub> species other than NO and NO<sub>2</sub>. Measure other NO<sub>x</sub> species if required by the standard-setting part. While you may also use other instruments to measure NO<sub>x</sub>, as described in §1065.272, use a reference procedure based on a chemiluminescent detector for comparison with any proposed alternate measurement procedure under §1065.10.

(b) *Component requirements.* We recommend that you use a CLD that meets the specifications in Table 1 of §1065.205. Note that your CLD-based system must meet the quench verification in §1065.370 and it must also meet the linearity verification in §1065.307. You may use a heated or

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unheated CLD, and you may use a CLD that operates at atmospheric pressure or under a vacuum. You may use a CLD that has compensation algorithms that are functions of other gaseous measurements and the engine's known or assumed fuel properties. The target value for any compensation algorithm is 0.0% (that is, no bias high and no bias low), regardless of the uncompensated signal's bias.

(c) *NO<sub>2</sub>-to-NO converter.* Place upstream of the CLD an internal or external NO<sub>2</sub>-to-NO converter that meets the verification in §1065.378. Configure the converter with a bypass line if it is needed to facilitate this verification.

(d) *Humidity effects.* You must maintain all CLD temperatures to prevent aqueous condensation. If you remove humidity from a sample upstream of a CLD, use one of the following configurations:

(1) Connect a CLD downstream of any dryer or chiller that is downstream of an NO<sub>2</sub>-to-NO converter that meets the verification in §1065.378.

(2) Connect a CLD downstream of any dryer or thermal chiller that meets the verification in §1065.376.

(e) *Response time.* You may use a heated CLD to improve CLD response time.

[70 FR 40516, July 13, 2005, as amended at 73 FR 37300, June 30, 2008]

### § 1065.272 Nondispersive ultraviolet analyzer.

(a) *Application.* You may use a non-dispersive ultraviolet (NDUV) analyzer to measure NO<sub>x</sub> concentration in raw or diluted exhaust for batch or continuous sampling. We generally accept an NDUV for NO<sub>x</sub> measurement, even though it measures only NO and NO<sub>2</sub>, since conventional engines and aftertreatment systems do not emit significant amounts of other NO<sub>x</sub> species. Measure other NO<sub>x</sub> species if required by the standard-setting part. Note that good engineering judgment may preclude you from using an NDUV analyzer if sampled exhaust from test engines contains oil (or other contaminants) in sufficiently high concentrations to interfere with proper operation.